DISPENSER PUMP

This invention relates to a dispenser pump as claimed in the preamble of claim 1 and 12.

The term "dispenser pump" is defined especially as a metering pump or manually activated pump for delivery of liquids, such as washing lotions for cleaning the human body, body care products, cleaning products, cosmetics, but also lubricants or the like.

EP 0 806 249 B1 which forms the point of departure for this invention discloses a dispenser pump for delivery of liquid from a container. The pump housing can be attached to the container and holds a pump shaft which can be manually pressed into the pump housing against spring force by the user's pressing on the dispenser button attached to the pump shaft. Two sleeve sections which can be pushed into one another as splash protection are mounted between the pump housing and the dispenser head. The reset spring is conventionally located in the pump cavity through which the liquid to be pumped flows.

Increasingly aggressive viscous liquids, especially in the form of washing lotions or the like, which are to be delivered by dispenser pumps in increasingly larger metered volumes per pump stroke have recently been increasingly offered. In order to convey a liquid of higher viscosity with the same operating force per pump stroke and/or to convey a larger amount per stroke, a larger pump stroke is necessary. Reducing the size of the pump stroke with the result of increasing the diameter of the pump cylinder on the other hand would have extreme disadvantages or problems in order to be able to intake liquids or other products of higher viscosity and to deliver them with an acceptable expenditure of force.

In the known dispenser pumps, splash protection leads to a superproportional increase of the overall axial height when the pump stroke is increased. Furthermore, it is disadvantageous in the known dispenser pump that very aggressive liquids can attack the metallic reset spring or a metallic check valve.

The object of this invention is to devise a dispenser pump which is suited for viscous, aggressive liquids, and especially in which a compact and durable structure with splash protection can be implemented.

The aforementioned object is achieved by a dispenser pump as claimed in claim 1 or 12. Advantageous developments are the subject matter of the dependent claims.

The first aspect of this invention is that the dispenser pump has at least one further sleeve section which is connected to the second sleeve section toward the pump housing and which can be pushed into it so that three or more sleeve sections form a telescopically extendable splash protection around the pump shaft between the pump housing and the dispenser head. Thus, when the pump stroke is increased, the additional overall axial height which is necessary beyond the increase of the pump stroke is greatly reduced compared to the prior art and accordingly enables a compact structure of the dispenser pump. Furthermore a simple and thus economical structure with effective splash protection results.

A second aspect of this invention which can also be implemented independently consists in placing a spring which is intended for resetting the pump shaft radially outside of the pump shaft and/or between the pump housing and the dispenser head, therefore outside of the areas which come into contact with the liquid to be pumped. In this way it is possible to prevent the spring which conventionally consists of metal from being attacked by increasingly aggressive liquids.

Preferably the check valve, especially its valve ball, is likewise made of plastic. In this way it is possible to prevent aggressive liquids from attacking the dispenser pump and/or metal ions from being taken up by the liquids and thus contaminating them.

Preferably all parts of the dispenser pump which come into contact with the liquid are made free of metal, especially from plastic.

Other advantages, features, properties and aspects of this invention become apparent from the following description of one preferred embodiment using the drawings. The sole figure shows the following:

a schematic, extract section of a dispenser pump as claimed in the invention with an assigned container which contains the liquid to be pumped.

The illustrated dispenser pump 1 is used to deliver a liquid 2 such as a washing lotion for cleaning the human body, a body care product, a cleaning product or the like. The liquid 2 can be especially relatively viscous and/or aggressive.

The container 3 is assigned to the dispenser pump 1; the dispenser pump 1 if necessary is detachably mounted on it. Thus, for example, replacement of the container 3 and/or refilling of the liquid 2 can take place.

The dispenser pump 1 has a pump housing 4 which can be attached to the container 3, in the illustrated embodiment by means of a collar section or threaded section 5 which is preferably directly molded on.

The dispenser pump 1 furthermore has a pump shaft 6 and a dispenser head 7 which is located on its free end.

The pump shaft 6 can be pressed in manually against the force of a spring 8 which causes resetting. The spring 8 pretensions the pump shaft 6 with the dispensing head 7 up into the initial position in the representation.

The dispenser pump 1 has an intake fitting 9 which is connected to the liquid 2 to be pumped or which extends into it, with an intake tube or the like which is connected to it and which is not shown, an inlet or return valve 10 with a valve ball 11, a delivery space 12 and a pump plunger 13.

The pump plunger 13 can be moved back and forth in the delivery space 12 by means of the pump shaft 6, in the illustrated embodiment up and down, and the pump plunger 13 for alternating clearance and closing of the through openings 14 can be moved to a limited degree into the interior 15 of the hollow pump shaft 6 relative to the pump shaft 6 and/or a valve means is implemented in some other way so that when the pump plunger 13 moves up, liquid 2 is intaken into the delivery space 12 and when the pump plunger 13 moves down, liquid 2 is pressed or conveyed through the interior 15 of the pump shaft 6 and is delivered by way of the dispenser head 7.

For the details of a possible implementation of the pump mechanism, reference is made in addition to EP 0 806 249 B1 which is hereby introduced in its full scope as a supplementary disclosure which is also critical to the invention.

The dispenser pump 1 has a first sleeve section 16, a second sleeve section 17 and a third sleeve section 18 which can be telescopically pushed into or pulled apart from one another and which surround the pump shaft 6 radially, spaced apart in the illustrated embodiment.

The first sleeve section 16 extends from the dispenser head 7 to the pump housing 4 and is especially molded onto or attached to the dispensing head 7.

The first sleeve section 16 extends peripherally over or around the second sleeve section 17 which for its part extends peripherally over or around the third sleeve section 18.

The third sleeve section 18 is held by the pump housing 4, especially is permanently connected to it, preferably molded onto it.

The dispenser pump 1 is conventionally used for a vertical container 3 so that the axis of the pump shaft 6 or of the pump motion runs essentially vertically. The sleeve sections 16, 17, 18 which overlap one another from top to bottom form effective protection, especially against splashing, but also optionally against dirt or the like, so that penetration of splashes, dirt or the like between the moveable pump shaft 6 which can also optionally be turned and the pump housing 4 or the slide guide 19 of the pump housing 4 can be effectively prevented for the pump shaft 6.

In order to ensure that the sleeve sections 16 to 18 overlap one another in any axial position of the pump shaft 6, therefore do not slip out completely in the axial direction, the first sleeve section 16 on its free end area adjacent to the second sleeve section 17 has an inner projection 20 which fits behind an outer projection 21 on the second sleeve section 17, and the second sleeve section 17 on its end area adjacent to the third sleeve section 18 has an inner projection 22 which fits behind an outer projection 23 on the third sleeve section 18. The inner projections 20, 22 and/or the outer projections 21, 23 are made preferably as annular shoulders, annular ridges, cone sections or the like, preferably continuously around the periphery, in order on the one hand to extend underneath with interlocking in the axial direction against axial separation of the sleeve sections 16 to 18 and on the other hand to form a labyrinth seal for effective protection against splashing or the like.

The annular surfaces of the inner projections 20, 22 and/or of the outer projections 21, 23, which surfaces run onto one another during assembly of the sleeve sections 16, 17, 18 when they are inserted axially into one another, are preferably bevelled or made conical in order to form insertion bevels which facilitate assembly so that the sleeve sections 16, 17, 19 can be pushed into one another, especially catching or snapping.

If necessary the inner projections 20, 22 and/or the outer projections 21, 23 can also be made, not continuously over the entire periphery, but optionally only in areas or sections over the periphery.

Instead of the inner projections 20, 22 and/or the outer projections 21, 23, the sleeve sections 16, 17, 18 can also be protected by other structural measures against slipping out completely, for example by wall-side recesses, individual projections or other measures.

In the illustrated embodiment the sleeve sections 16, 17, 18 in cross section are made preferably essentially hollow-cylindrically with a circular cross section. But the sleeve sections 16, 17, 18 can also have other cross sectional shapes, for example a polygonal, elliptical or oval cross section or some other, also irregular cross sectional shape.

The figure shows the dispenser pump 1 with the pump shaft 6 extended, therefore in the initial position. When the dispenser pump 1 is actuated, the user pressing especially on the dispenser head 7, the pump shaft 6 is pushed into the pump housing 4. In doing so the sleeve sections 16, 17, 18 are pushed into one another or together and overlap one another at least essentially over the same axial length.

The ratio of the overall axial length in the retracted state to the overall axial length of the sleeve sections 16, 17, 18 in the extended state is much smaller than in the prior art, so that for a given pump stroke (difference between the extended state and retracted state) a much smaller overall axial height of the dispenser pump 1 can be implemented compared to the prior art.

The spring 8 consists preferably of metal, especially spring steel, as is conventional. It is made as a helical spring in the illustrated embodiment.

The spring 8 is located radially outside the pump shaft 6 and between the pump housing 4 and the dispenser head 7. Thus, the spring 8 does not come into contact with the liquid 2, in contrast to the prior art. Accordingly the spring 8 cannot be attacked by aggressive liquids.

The spring 8 is covered by the sleeve sections 16, 17, 18 and thus is protected against splashing and the like.

The spring 8 is supported on the one hand on the dispenser head 7 and on the other on the pump housing 4.

On the side of the pump housing 4 the spring 8 is preferably slipped onto a guide sleeve 24 which is held by the pump housing 4 and which extends from the pump housing 4 roughly up to the length of the third sleeve section 18 to the dispenser head 7 and in the area of its free end on the inside holds an annular seal 25 which forms the already mentioned slide guide 19 for the pump shaft 6.

The spring 8 is therefore located in the area of its lower or housing-side end in the annulus between the guide sleeve 24 and the third sleeve section 18, otherwise in the annulus between the pump shaft 6 and the other guide sleeves 16, 17.

The valve 10, especially its valve ball 11, is made preferably of plastic. With a corresponding choice of the plastic it is possible in this way to prevent increasingly aggressive liquids 2 from attacking the valve ball 11.

In particular, all the parts or areas of the dispenser pump 1 which come into contact with the liquid 2 are made from suitable plastic, so that no metal parts come into contact with increasingly more aggressive liquids 2.

It follows from the aforementioned that the dispenser pump 1 as claimed in the invention is suited for delivery of viscous and aggressive liquids 2. The diameter of the delivery space 12 and of the pump plunger 13 which significantly affects the stiffness of the dispenser pump 1 is chosen to be relatively small especially for viscous or highly viscous liquids 2, in order to enable relatively easy actuation of the dispenser pump 1. In order to achieve the desired delivery amount of preferably at least 2 ml, especially at least 3 ml or more, per pump stroke, the pump stroke is lengthened accordingly. Proceeding from a certain pump stroke an overall axial height or length of the dispenser pump 1 which is much smaller compared to the prior art can be implemented by the sleeve sections 16, 17, 18 which can be pushed telescopically into one another and which are provided as claimed in the invention.

In the illustrated embodiment there are three sleeve sections 16, 17, 18. Of course if necessary there can also be four or more sleeve sections.

Instead of the sleeve sections 16, 17, 18 which are made at least essentially rigid, to protect against splashing if necessary there can also be a bellows-like protective element which is not shown or the like.